

HOLMES (B)

# SURGERY OF THE KIDNEY

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Being a Study of a Series of  
Cases in which Methods of  
Diagnosis and Treatment are  
Illustrated

...

BY BAYARD HOLMES, B.S., M.D.

PROFESSOR OF PRINCIPLES OF SURGERY IN THE COLLEGE OF PHYSICIANS  
AND SURGEONS OF CHICAGO

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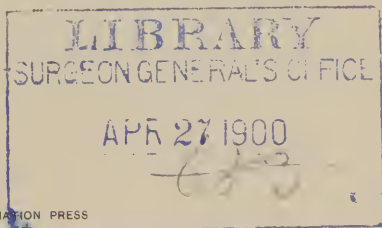
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## SURGERY OF THE KIDNEY.

BEING A STUDY OF A SERIES OF CASES IN WHICH METHODS  
OF DIAGNOSIS AND TREATMENT ARE ILLUSTRATED.

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### TUBERCULOSIS OF THE KIDNEY.

In this series of cases two appear to have been tubercular, although in neither case was an absolute diagnosis made before operation, and in the second case doubt still remains as to the real cause of the disease. In both cases, however, all the means of diagnosis known, except inoculation experiments, were made, and every step was guided by positive indications for treatment. In the first case, Mrs. S., nephrectomy was contraindicated by the desperate condition of the other kidney, determined by catheterizing the ureters. In the second case, Miss C., unusual difficulties presented themselves and they were overcome, one by one. The treatment of this patient was most conservative and careful. The full report of these cases it is believed will be useful and suggestive.

*Case 1.—Synopsis: Sudden obstruction of right ureter three years ago; pyonephrosis; aspiration, drainage: occasional discharge of calculi through the wound; continued fever and chills with cystitis; catheterization of both ureters showing advanced disease of left kidney; removal of calculus and evident; death in five months from uremia.*

Mrs. S., aged 34, mother of three children, consulted me in August, 1894, and gave the following history: Three years ago, and some years after the birth of her last child, she was taken with chills, fever and pain in the right side. The chills continued for three weeks, when a large tumor appeared in the right side. This tumor fluctuated and was aspirated repeatedly by the attending physician, and a large quantity of pus withdrawn. The puncture was at last enlarged

and a tube inserted in the loin for permanent drainage. The temperature became normal and the patient gradually gained in health and strength, but she was continually troubled by the closing of the sinus and the recurrence of the chills. There was considerable irritation of the bladder and almost constant night sweats. Many small pieces of stone were discharged from the sinus, indicating the presence of other calculi. The patient was a thin, slight woman, of a nervous temperament and a quick, intelligent look, a bright, quick eye and expressive, nervous features. She had a well-formed thorax with no show of tubercular disease in either lung, no enlarged lymph glands in the neck or axillæ and no indication of general tuberculosis. The heart had a free, normal and regular pulsation which was rapid, 96, and violent. The apex was farther removed from the median line than is normal. The arteries were soft and flexible. The abdomen presented no abnormality except a tumor three inches in diameter in the right side, which was connected with a sinus opening through the skin halfway between the crest of the ilium and the border of the ribs. This tumor was painful on pressure and was evidently the enlarged displaced kidney. Examination of the urine showed a normal quantity containing from six to eight points of albumin measured by the Eshbach albuminometer, some casts and a large quantity of pus and mucus. Examination of the sediment for tubercle bacilli was made by me without result, though many other bacilli were found. In a vaginal and rectal examination the right ureter was found to be about 1 cm. in diameter, hard and painful to pressure. The left ureter was smaller and softer, but very easily recognized and somewhat sensitive. Still I hoped that the left kidney might be found sound and well. Although the patient's condition was not good, I determined to make an effort to remove the calculus from the right kidney and perhaps close the sinus, and at the same time make a positive diagnosis of the condition of the left kidney.

With the assistance of Dr. George Nesbitt and Dr. Harry Wilder the patient was prepared and anesthetized with chloroform, the urethra was dilated and the ureteral sounds passed by touch into the two ureters. From the right ureter a thick pus a few drops at a time passed on pressure above the brim of the pelvis. From the left ureter an average quantity of turbid urine passed in intermittent jets of four or five drops, but the quantity was not measured. This urine contained considerable albumin and was very turbid. It was immediately examined under the microscope. The quantity of pus and its character seemed to indicate an advanced condition of disease in the left kidney and contraindicated any extensive operation upon the remnant of the right kidney. The patient was again brought fully under the anesthetic and the sinus enlarged sufficiently to remove the calculus in the pelvis of the degenerated right kidney. This calculus was  $1\frac{1}{2}$  inches long and nearly 1 inch in diameter. The pelvis and ureter of the right kidney were carefully examined with the finger and no other stones were found. Nephrectomy seemed to be contraindicated by the condition of the remaining kidney; the granulation tissue, which was evidently tubercular, was therefore scraped away and the wound packed with iodoform gauze. The patient was put to bed in good condition and rallied promptly. The wound was dressed upon the fifth day and daily afterward by Dr. Nesbitt. The temperature, which had been about 100 degrees at night before the operation, gradually fell to normal, but the quantity of albumin in the urine increased for two weeks and then, with a milk and kumyss diet, it gradually fell to a mere trace. The wound healed slowly. The urine, however, began to be scanty three months after the operation, and the patient died in uremic convulsions two months later and five months after the operation. No postmortem was made.

In this case nephrectomy and ureterectomy would certainly have been made, in spite of the thickening

of the left ureter, had not catheterization of the ureter demonstrated the advanced disease of the left kidney. Had this operation been done the danger to the patient's life would have been much greater, and the benefit to be expected no more than by the simpler procedure.

*Case 2.—Typhoid at 12 years followed by cystitis, bloody urine, pain in side, strangury; slow improvement; after ten years, drainage of the bladder for nine months with slight improvement; catheterization of the ureters demonstrates a healthy and competent right kidney and degenerated and suppurating left kidney; nephrectomy; partial ureterotomy; implantation of vesical end of ureter into the vagina; recovery.*

Miss C., aged 40, consulted me in December, 1895, for a pain which she constantly felt in her left side in the region of the left ovary, and for frequent painful urination and occasional attacks of chills and fever. She gave a family history of the best kind. Her ancestors were of healthy German stock and she was herself well until her eleventh or twelfth year, when she had a very severe attack of typhoid fever from which she made an imperfect recovery. Following typhoid fever there was painful and frequent micturition, which at last became so desperate that her clothes became offensive from ammoniacal urine, and it was impossible on this account for her to get any position to work. During this time there was great pain in the side which was relieved by lying down. Occasionally there would be a discharge of bloody urine and at all times, as appears from the history, a considerable quantity of pus at irregular intervals. The symptoms, however, somewhat subsided after two or three years, and the patient was able to go about in spite of frequent attacks of pain and painful urination. Many physicians were consulted without avail, and at last fourteen years ago the bladder was examined by Dr. E. C. Dudley, who made some operation upon it resulting in drainage of the bladder. This drainage was continued for nine months when the opening was closed up and the patient had some relief. She frequently rose to urinate nevertheless as

many as nineteen times in the night as she discovered by an ingenious method. Every time she rose she took a match from her match box, laid it on the table and counted the matches in the morning. About once in two or three months during the past ten years she had attacks of "pain in the side" of a very severe character. During these attacks there was a high temperature and rapid pulse. She used the thermometer and frequently found the temperature 105 degrees F. Vomiting often accompanied these attacks, and they usually passed off after two or three days with a discharge of urine containing half or two-thirds its bulk of pus. She could give accurate information upon this point from the fact that she collected the urine in a wide-mouthed bottle, and allowed it to stand long enough to see the amount of sediment. During the past five or six months the attacks have been more painful and more frequent than heretofore. They had appeared as often as once in three weeks.

When I first saw her she had just recovered from an attack of this kind. The specimen of urine which she gave me at the time had only a small sediment of pus, and contained only a small amount of albumin, there were no casts or other evidence of nephritis. The patient was large and covered with a thick layer of fat making examination difficult. The lungs were perfectly healthy, and the heart free from murmurs but enlarged considerably, so that the apex beat lay  $3\frac{1}{2}$  inches from the median line. The spleen and liver could not be palpated, and the area of hepatic dullness seemed to be less rather than more than normal. There was no tumor to be felt in the abdomen, but there was a region of very marked tenderness commencing at the edge of the left short ribs and extending downward into the left pelvis. The points of greatest tenderness seem to be at the upper and lower extremity of this line. The region of the bladder was also distinctly tender upon pressure. The vagina was found to be normal and very small, and the infantile uterus was found lying in its nor-

mal position and perfectly movable. In the pelvis there could be easily palpated a distinct tumor upon the left side which seemed to be quite hard, apparently cystic and excessively tender to pressure. The meatus urinarius was red and on pressure a small amount of pus could be forced out of the numerous folds of the mucous membrane. The patient's temperature at this time was normal and her pulse 72. There were 1200 c.c. of urine passed in 24 hours and this urine was alkaline and had a specific gravity of 1.011 and contained 28 grammes of urea; there was a considerable quantity of pus present but no casts. On February 15, the patient was put in the knee chest position, the urethra dilated, the bladder cocaineized and inflated and the silver ureteral catheter successfully passed into the right ureter. She passed 6.5 c.c. of urine through this catheter in fifteen minutes. This urine contained absolutely no pus, no epithelium, no albumin and it registered 40 milligrams of urea to the c.c. It was of acid reaction but the quantity was not sufficient to allow me to take the specific gravity. It was not perfectly clear, but was slightly turbid with a sediment of amorphous urates and phosphates. At this time it was impossible to find the left ureter and the patient was so much exhausted that no farther examination was made. The bladder appeared perfectly normal except for a rather pale and anemic patch where the left ureter would naturally be looked for. A day or two afterward a second attempt was made to find the left ureter but without avail. The right ureter was catheterized again with practically the same result. For nearly two weeks attempts were made on each succeeding day to find the left ureter, but no trace of it could be made out, although at each sitting the orifice of the right ureter was plainly visible. Search was made for an abnormally placed ureteral orifice in the urethra also. Various positions were tried and various methods of catheterization were equally unsuccessful.

Although a diagnosis of suppurative disease of the



left ureter and kidney had been made it seemed necessary to make this diagnosis positive before so grave an operation as nephrotomy or nephrectomy should be undertaken. There was indubitable evidence of a painful tumor in the left side of the pelvis about where the ureter ought to be found, and this was also the location of occasional spasmodic pains accompanied by a desire to urinate. The possibility of a calculus in this portion of the ureter was kept in mind and on March 11 the patient was prepared for an anesthetic. On March 12 after a comfortable night, during which about three pints of distilled water had been taken by the mouth, and after the colon had been flushed with very hot water, the patient was anesthetized with chloroform and with the assistance of Dr. Fletcher, Dr. D. H. Galloway and Dr. Mary Bates the bladder opened along the line of the old sutures by an incision long enough to allow the finger to be passed into the bladder. The location of the right ureter could not be felt. The orifice of the left ureter was recognized by a hard mass in contact with the wall of the bladder and by the resistance of a line of scar tissue which extended about an inch upward from the normal location of the orifice of the left ureter to this hard mass. By means of a small probe passed into the bladder under the point of the finger the end of the scar was recognized as the contracted orifice of the ureter into which the probe passed with difficulty. The sound was withdrawn and a silver ureteral catheter passed in its place. Three ounces of a clear, watery fluid with a few shreds of pus then passed out the catheter with considerable force. Two ounces of this fluid were first secured for examination and then the region of the kidney and ureter was kneaded and one ounce of almost pure pus was forced out by manipulation. A long flexible ureteral catheter 2 mm. in diameter and fifty centimeters long was then passed in the place of the silver catheter and pressed forward until it was believed to be in the pelvis of the kidney and until it met a distinct resist-

ance. Through this catheter three ounces of warm sterilized water was easily carried by gravity into the pelvis of the kidney and then allowed to run out. This was repeated several times. The catheter met with no obstruction in its course through the ureter. It was decided to leave this catheter in the ureter and wash out the kidney for a day or two, hoping in this way to save the kidney. This catheter and the irrigation produced no pain.

The patient was put to bed in good condition. The two ounces of fluid removed from the distended ureter at this operation contained a considerable amount of pus, a trace of albumin and some carbonates and less than one-seventh the amount of urea which normal urine contains. This pus was laboriously examined for tubercle bacilli by methods that proved adequate with sputa, but none could be found. This examination seemed to me to indicate a nearly complete destruction of the left kidney. For the first time I had in my possession the information necessary to warrant the complete removal of this kidney and its ureter. During the succeeding week the patient's temperature never rose above 99.3 F. and her pulse varied between 82 and 96 as shown in the accompanying chart. (Fig. 1). She slept well. The kidney was washed three or four times a day with sterilized water or with a solution of permanganate of potash. During all this time a thick green pus poured out of the catheter at the rate of about one and one-half ounces per day but no urine escaped. After trying this irrigation for a week without any diminution in the amount of pus the catheter was carefully removed. The urine and the antiseptics which had been used had produced a hardening of the catheter so that it was no longer flexible but continued to keep the shape it had been in during the week. This made a very interesting cast of the ureter and showed that the kidney was displaced forward and that the ureter made quite a sharp turn about one and one-half inches from the end of the catheter



and that it maintained during the rest of its course to the bladder a rather broader excursion from the spine than is normal. A drawing of this catheter on a reduced scale with the supposed position of the kidney and bladder is given below. (Fig. 2). While in bed with the catheter in place an attempt was made to take a skyagraphic picture of the region of the kidney, hoping to demonstrate the presence or absence of a calculus, but this experiment was without result.

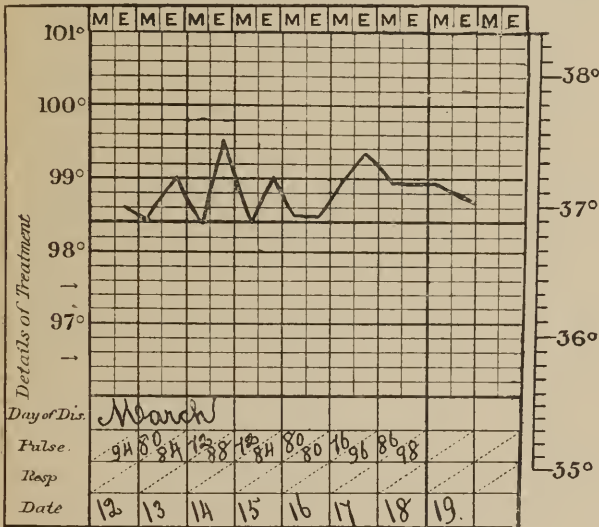


FIG. 1. Miss C.

The patient went home for a rest and was put on a full diet with one quart of milk and a quart or more of lithiated water each day.

On the first day of April the patient returned to my care in St. Luke's Hospital for the removal of the kidney. Examination at this time showed that 82 ounces, 2,624 cubic centimeters, of pale alkaline urine with a specific gravity of 1.004 and no albumin, no sugar and only a trace of pus and bladder epithelium,

were passed in twenty-four hours. This urine contained 22.5 grams in twenty-four hours. The total solids for twenty-four hours was 44 grams.

Her temperature on the night before the operation was 98.8 degrees F. and her pulse 82 to 94 and her respiration 24 per minute. Several small doses of calomel were given during the afternoon followed by castor oil and in the morning an enema. The patient was anesthetized with chloroform and an oblique incision was made below the margin of the last rib in the lumbar region and curved forward over the crest of the ilium and then downward. The muscles and fascia were divided down to the kidneys. The kidney was carefully separated from its surroundings by breaking up the adhesion and drawn up into the wound. During this manipulation the wall of the kidney was ruptured and a considerable amount of clear fluid apparently containing pus escaped into the wound. A clamp was placed upon the very small renal vessels and the kidney with the ureter attached was separated and drawn forward. The ureter was dissected out as low down into the pelvis as possible, where it was found about the size of the patient's middle finger, thin walled and at least 15 mm. in diameter. The ureter was grasped with forceps, cut off and its edges caught with catgut sutures and turned in and the raw edges brought together with sutures and tied. The end of the ureter was then dropt into the pelvis. The patient stood the operation very well but took the chloroform with some difficulty. The temperature record during the succeeding four weeks is given in the accompanying chart. (Fig. 3). The wound healed up rapidly but there was a tender and painful spot in the pelvis which was supposed to be the end of the suppurating ureter and another operation was undertaken for the purpose of implanting it in the vagina if it was found impossible to remove it. This operation was done April 27. After the ordinary preparation the day before, the patient was anesthetized and an incision was made in the left cul-de-sac

of the vagina and the finger pressed in. A catheter was again with great difficulty passed into the greatly contracted orifice of the left ureter and distinctly felt by the finger in the vault of the vagina. With the finger-nail and a dissecting forceps the ureter was loosened up as high as possible, but it was found to be impossible to remove the upper end of the ureter from its attachments. An artery forceps was passed into the opening in the vault of the vagina by the side of the finger until near the bladder it was felt to

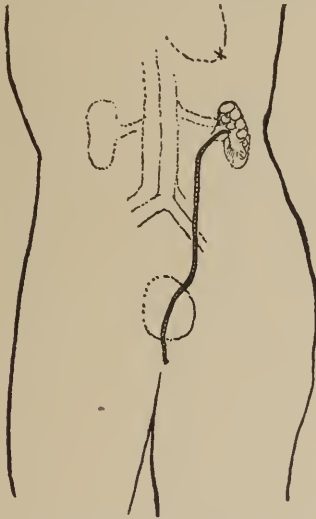


FIG. 2. Showing supposed position of catheter.

grasp the ureter with the ureteral sound in it. The sound was then removed, the artery forceps clamped and the ureter cut off on the bladder side of the forceps. By means of several sutures the end of the ureter was pulled down and fastened into the vagina. The contracted orifice of the left ureter in the bladder seemed to promise closure without any manipulation and it was let alone. The incision in the bladder through which the left ureter had been catheterized

was then partially closed up and a catheter was left in the urethra for drainage.

The patient again suffered a great deal from the anesthetic, but otherwise did well. The temperature chart shows her condition after this operation as long as she remained in the hospital. The ureter remained firmly attached in the vagina and no urine passed from the bladder into the wound and there is every reason to believe that the left ureteral orifice in the bladder is closed up. The suture of the bladder, however, was not successful and it all opened in three or four days. After so many examinations and so much operative procedure the patient lost spirit and strength and she was sent home to recuperate. The urine has been examined several times since the operation and it is entirely free from abnormal constituents.

The accompanying sketch (Fig. 4), gives a fair idea of the cystic condition of the kidney. The upper two-thirds of the kidney were entirely destroyed and the place of the normal elements of the kidney was filled with eight or ten cysts, some of them, at least, did not open into the pelvis of the kidney at all. One cyst contained a white cheesy substance which was insoluble in either cold or boiling hydrochloric acid or in dilute hydrochloric acid cold or boiling, or in cold or boiling nitro-hydrochloric acid, but turned yellow in the latter, or in cold or boiling water; or in cold or boiling alcohol; or in cold or boiling carbon disulphid. It was disintegrated and partly soluble in 5 per cent. solution of caustic potash. Its color was not changed by iodine. Under the microscope it was granular, but on pressure of the cover glass it became homogenous like lard. Tubercle bacilli could not be found in the cyst contents. In the lower part of the kidney there was a mass of fatty degenerated substance and close to it, marked 5,5, two bits of functioning kidney substance. No valve formation could be demonstrated in the case of the single cyst which opened into the pelvis of the kidney and the other cysts were certainly entirely



separated from the pelvis and from each other. The ureter as it left the pelvis of the kidney had a diameter of 1 centimeter and a caliber of less than 1 millimeter. Three inches lower down the walls of the ureter were 1 millimeter only in thickness and the

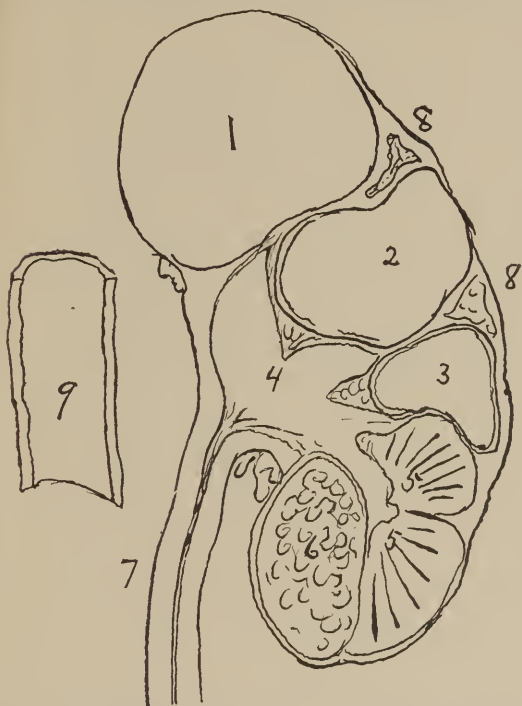


FIG. 4. Diagram of Kidney and Ureter. 1, 2, 3, Cysts not connected with ureter; 4, slightly dilated pelvis; 5, partially functioning remnant of kidney; 6, encysted fatty degenerated material; 7, greatly thickened ureter; 8, masses of fat and connective tissue; 9, the relative size and thickness of dilated ureter.

diameter of the ureter was 13 millimeters. A segment of this ureter near the pelvis of the kidney is shown in (Fig. 5). In the section of the ureter, the plications of the mucosa occupy a little more than half the thickness of the tube. The mucous membrane is

intact for the most part and is covered by a regular layer of cylindrical epithelium overlaid by a fold of elastic connective tissue. This is surrounded by a double layer of muscular tissue in which are blood vessels and lymph channels. The pathology of this ureter seems to consist in increase in all the tissues beyond the cylindrical epithelium, in defects in the mucous membrane in places, and in masses of inflammatory tissue containing lymphoid cells which have infiltrated the muscular tissue outward from these defects in the mucosa. The active cells seem to penetrate between the bunches of muscle fibers and fill the intermuscular spaces. The blood vessels in places show advanced endarteritis and they are surrounded by inflammatory tissue, the cells of which take on a strong stain. Even outside of the outer layer of muscles are masses of leucocytes grouped about defects or openings in the bundles of muscular tissue.

"Of the 63,000,000 persons living to-day in the United States 9,000,000 or more will die of tuberculosis. This would mean about 150,000 deaths from this disease each year." (Victor C. Vaughan). It is probable that one out of every sixty of the inhabitants of this country or of the world is in the process of dying of this disease. The number of persons actually infected is much greater. Probably one-half or three-fourths of the inhabitants of cities are tubercular. It is not a wonder therefore that renal tuberculosis is a common disease. Dickinson<sup>1</sup> gives the result of the examination of 600 consecutive post-mortems in two London hospitals, 300 were individuals over 12 years of age and 300 under 12 years of age; 180 of these individuals were tubercular, 126 under 12 and 54 over 12; 66 had renal tuberculosis, 49 under 12 and 17 over 12. In the young, males and females are attacked by renal tuberculosis with equal frequency. Among adults men are much more frequently attacked than women. Dickinson saw 44 cases in

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<sup>1</sup> Dickinson, W. H.: On renal and urinary affections N.Y. Wm. Wood & Co. 8 p. 87.



men and 23 women. Emil Palet<sup>2</sup> says that of 100 cases of renal tuberculosis studied by him only 16 proved to involve both kidneys, while in another series of 42 fatal cases operated upon, all were onesided



FIG. 5. Segment of the ureter an inch from the pelvis of the kidney drawn with the camera lucida and half-inch objective. This drawing shows two defects in the mucosa and adjacent inflammatory areas, reaching out beyond the muscular layer. Atheromatous arteries are also shown and lymph spaces filled with leucocytes.

<sup>2</sup> Palet, Emil : Des résultats immédiats et éloignés de la nephrectomie dans la tuberculose rénale. Thèse, Lyons, 1893.



except 12. Two thousand two hundred and thirty-one cases were treated in St. Thomas's Hospital<sup>3</sup> during the year ending Dec. 31, 1890, among which were the following:

Sarcoma of the kidney, 1; tubercular disease of the bladder, 2; hematuria, 4; pyuria, 2; renal calculus, 1; tubercular kidney, 1; pyonephrosis, 4; renal sinus (tubercular?) 1.

During the six months ending July 1, 1890, there were 3,860 patients treated in the Cook County Hospital,<sup>4</sup> among which were the following:

Perinephritic abscess, 1; movable kidney, nephrorrhaphy, 4; cirrhosis of kidney, 4; acute nephritis, 8; chronic nephritis, 34; pyelitis, 1.

During the six months ending December 31, 1890, 3,823 cases were treated, among which were the following:

Movable kidney, 3; perinephritic cellulitis, 3; rupture of the kidney, 4; cirrhosis of the kidney, 1; acute nephritis, 7; chronic nephritis, 56; pyonephrosis, 3; renal abscess, 1; renal colic, 1; tuberculosis of kidney, 1.

This disease begins as a metastatic focus in the kidney usually after an injury or at a time when the vital resistance is reduced by some intercurrent disease, or it arises from an extension upward of a tuberculosis from the epididymis or seminal vesicles through the prostate, bladder and ureter in the male, and from the urethra through bladder and ureter in the female. The greater number of cases are of renal origin. There may be some doubt of the secondary metastatic nature in some cases, but the frequency of a preceding injury, a preceding infectious disease and a latent tuberculosis elsewhere speaks strongly for the metastatic origin.

Much has been written of gonorrhea and tuberculosis acquired at the same time. There is reason to look with some suspicion on these observations on

<sup>3</sup> Hadden and Anderson: St. Thomas Hospital Report, Vol. 20, 1892.

<sup>4</sup> Mitchell, Louis J.: Medical and Surgical Reports, Cook County Hospital, Vol. 1, 1890; Vol. 2, 1891.

account of the difficulty of distinguishing the tubercle bacillus from the smegma bacillus.

The clinical history of these cases is illustrated in my cases and in those which every physician will revive from the memory of his own practice or from his reading. The beginning is insidious. There is usually a slight rise of temperature and some discomfort, sideache, backache, dragging or burning pains in the abdomen; but in other cases these symptoms are entirely wanting and the first symptoms are cystitis

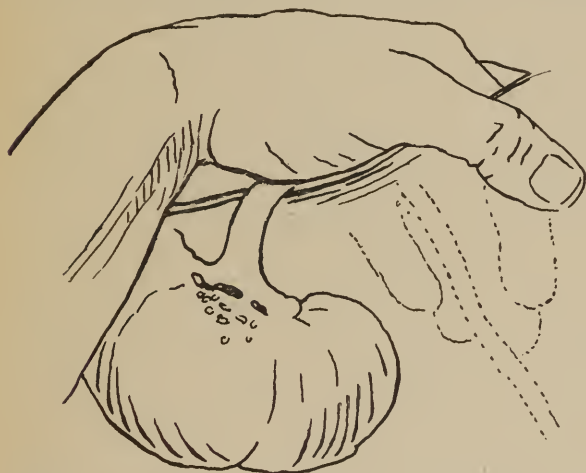


FIG. 6. Renal vessels divided and ureter freed down to brim of the pelvis.

and pus in the urine. The diagnosis of renal tuberculosis presents the greatest difficulties and until very recently its absolute accomplishment has been declared by nearly all authors impossible in its early stages. Since the ureteral catheters of Pawlik and Casper have come into use an absolute diagnosis is certainly possible in many cases and in all cases the diseased condition of the tubercular organ can be detected and the healthy and competent condition of the opposite kidney can be established. This method is illustrated

in my cases. On men it is necessary to use Casper's instrument.

The symptoms of renal tuberculosis are easily recognized, the fever, the pain, heaviness or tenderness, the cystitis, the pus in the urine and the granulating or inflamed condition of that portion of the bladder into which the ureter from the infected kidney opens. The urine should be allowed to settle and the sediment precipitated by the centrifugal machine. The precipitate should be examined for tubercle bacilli. They may be found and then may be overlooked. If they are found it must not be forgotten that some of the best observers have mistaken the smegma bacillus for the tubercle bacillus. Mendlesohn<sup>5</sup> lately demonstrated a kidney removed a few days previously from a patient with the following interesting history. She had noticed that there had been some pus in the urine for months. There was some pain but no tenderness. The urine was found full of pus, fatty acid crystals, red blood corpuscles and oxalate of lime crystals. The Casper cystoscope was used and the normal rhythmic flow of urine from the right ureter was observed, while from the left ureter there passed out a steady stream of thick greenish pus that settled down into the bottom of the bladder. The ureters were catheterized and the urine from the right ureter found to be normal, clear and abundant, while pus alone was secured from the left kidney. Tubercle bacilli could not be discovered in this pus though they had been found in the urine before catheterization of the ureters. The diagnosis was, however, considered absolute, namely a tuberculosis of the left kidney with complete destruction of its function and a healthy and competent right kidney. The left kidney was extirpated and the kidney substance found almost completely destroyed. Two stones were found in the pelvis.

Professor Leyden in discussing this case called attention to the great difficulty of making a positive

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<sup>5</sup> Mendlesohn: Berlin klinische Wochenschrift, April 27, 1896.

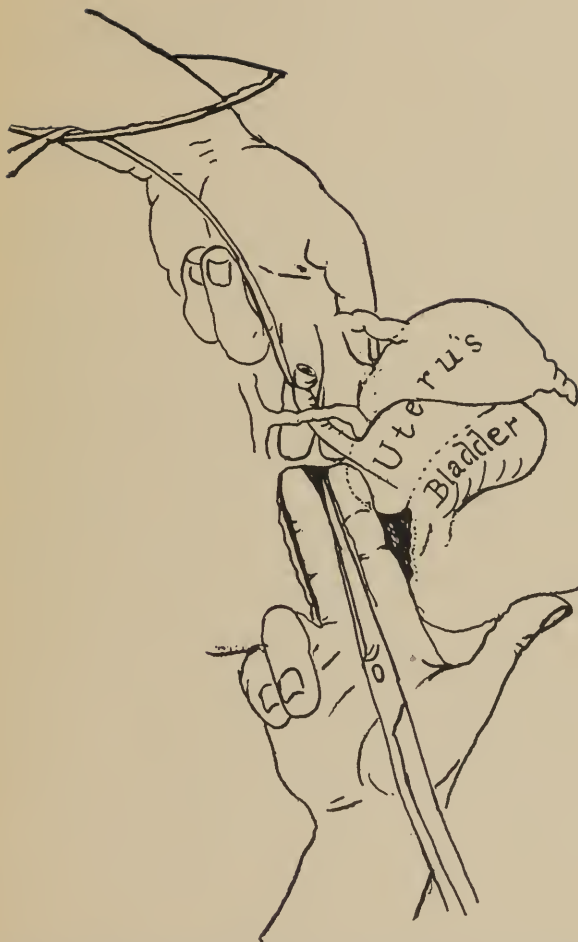


FIG. 7. Opening of vaginal vault to bring the extremity of ureter into vagina. The assistant's hand and scissors in vagina, operator's hand in lumbar wound after removal of kidney and abdominal portion of ureter.

diagnosis of renal tuberculosis by examining the excretions from the kidney and finding the tubercle bacillus on account of the almost omnipresence of the smegma bacillus in pyelitis and the great similarity of this organism to that of tuberculosis. It is true there are differences; the smegma bacillus is more delicate and does not exhibit the granular divisions that the tubercle bacillus does, but the staining reactions are the same. Leyden thinks that the only reliable method of identifying the tubercle bacillus in such cases is by inoculation of animals. Senator and König agreed with Leyden.

Casper<sup>6</sup> gives an account of an interesting case illustrating the proper method of making an accurate and absolute diagnosis and as it brings out some new points it may be well to briefly abstract it here.

The patient was a woman 42 years old who had been well until six months before. At that time she took cold and had a catarrh of the bladder with painful urination and turbid urine. Then followed pain in the right side, with a sensation of tension. Irrigation of the bladder was tried without avail and at last through palpation some disease of the right kidney was diagnosed. When Casper first examined the patient he found her an undersized, delicate but apparently well-nourished and sound woman. She complained of pain in the abdomen, especially on the right side. The pain, she says, comes on with exercise and motion, and she is free from pain when resting in bed. Turning in bed, however, brings on the pain. Sometimes she is entirely free from pain whatever she does. She urinates oftener than formerly, during the day every three hours and two or three times at night.

The urine removed from the bladder with a catheter was slightly turbid, acid, specific gravity 1.018. It contained many pus corpuscles, some caudate epithelium, but neither red blood corpuscles nor casts. Albumin was present in considerable quantities.

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<sup>6</sup> Casper, L.: Die frühe und exacte Diagnose der Tuberculose des Harntractus, Berlin, klinische Wochenschrift, April 27, 1896.

Tubercular bacilli were found in the sediment thrown down by the centrifugal machine. Palpation disclosed nothing abnormal. The kidneys could not be palpated. Neither the kidneys nor the region of the

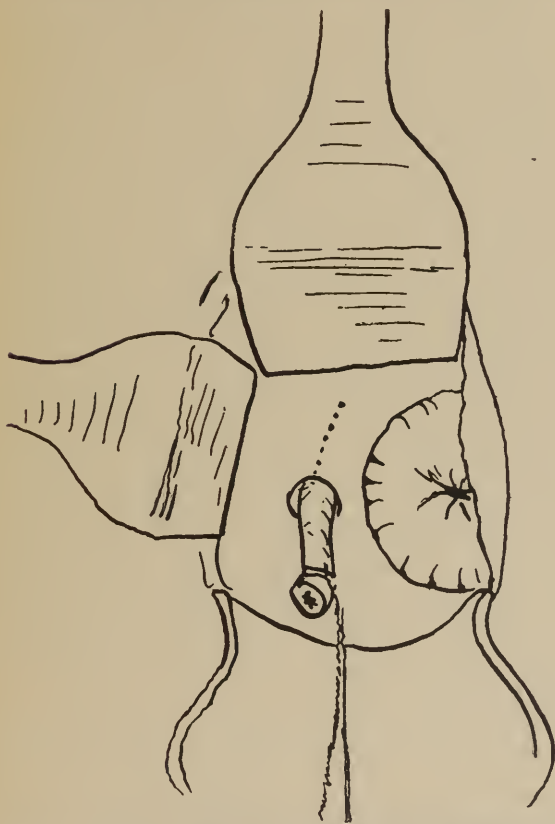


FIG. 8. Removal of the lower end of the ureter through the vagina distended with three retractors. The entire remnant of the ureter to be removed through incision in vault of vagina marked by dotted lines.

bladder were tender on pressure. The genital apparatus was apparently sound.

Casper's cystoscope was used to introduce 200 cubic centimeters of boracic acid solution into the bladder. This solution by irrigation quickly became clear and the surface of the bladder, except in the neighborhood of the right ureter, was seen to be perfectly smooth, whitish-yellow and glistening. Under the mucosa, the blood vessels could be seen as usual. In the locality where the right ureter ought to have been found, however, there was a granulating mass and the mouth of the ureter could not be seen. The mouth of the left ureter could be easily observed giving out every few seconds a spurt of clear urine. In the neighborhood of the granulation tumor around the mouth of the right ureter occasional whirls of fluid could be seen as if the ureter was discharging there.

On the following day the left ureter was easily catheterized and a clear normal urine removed. The right ureter was also catheterized by manipulation, though the mouth of the ureter could not be seen. Turbid urine containing pus and albumin was withdrawn, but tubercle bacilli could not be found in this specimen. Three days later the right ureter was again catheterized and the urine found to contain tubercle bacilli and a larger proportion of urea than the bladder urine. A diagnosis of tuberculosis of the right kidney and circumscribed tuberculosis of the bladder was made. This patient was operated upon afterward and the right kidney removed. It was covered with tubercles and two cheesy foci were found in the parenchyma. The patient recovered and is well. The pain is gone and the urine clear.

When an absolute diagnosis of tuberculosis of one kidney has been made and when an equally positive demonstration of the healthy condition of the opposite kidney is at hand, then alone are the indications positive and absolute for the removal of the diseased kidney and ureter. This diagnosis may be tabulated as follows:

*a.* Tuberculosis of one kidney (absolute) secreting little or no urine.



b. Healthy condition of the other kidney secreting a normal amount of urine containing average amount of normal constituents.

c. Bladder only slightly involved near the ureter of sick kidney, patient otherwise in good condition.

Indications. Prompt removal of diseased kidney and ureter.

It may be asked on what data these indications depend; this study is of sufficient clinical interest to go into it more fully. The following questions will be asked and answered:

1. What is the course and duration of primary tuberculosis of one kidney if left to itself or treated medically?

Dickinson says all his cases terminated in death within four years after the onset of the disease. Belfield<sup>7</sup> says the disease always tends to a fatal termination; this end may, however, be delayed several years and cases are known in which the disease lasted ten, fifteen and seventeen years.

Tuberculosis elsewhere in the body is a progressive and destructive disease. It begins in the parenchyma of the kidney and advances through the ureter into the bladder. Then it advances up the other side, but before this is accomplished the peri-renal tissues are invaded by the lymph channels, or the toxemia of secondary infection of the tubercular urinary tracts comes on together with temporary renal insufficiency and the exhaustion of cystitis.

2. What is the prognosis under nephrectomy? Very little statistic material is at hand. Palet (l. c.) records eight cases of death from general tuberculosis during the first six years after operation out of a total 136 cases operated upon, but the methods of diagnosis in those cases were imperfect as is shown by the fact that in seventeen cases nephrectomy was done with the other kidney so diseased that death from anuria followed immediately. In twelve of these seventeen

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<sup>7</sup> Belfield, W. T.: Diseases of the urinary and male sexual organs, N. Y., 1884, p. 254.



cases the disease of the other kidney was tubercular.

There is an analogy which may be useful in this connection. The removal of local tubercular disease elsewhere in the body gives very good results. Tubercular foci in bones, tubercular lymph-glands and tubercular disease of the skin and mucous membranes can show a very large percentage of permanent recoveries after local mechanical removal.

Since there is only a small chance of life and that a very painful and miserable life, if the disease is let alone, and since the removal of the diseased kidney promises both theoretically and practically a great increase in the length of life and a greater improvement in its quality through relief from pain and the toxemia of secondary infection, *therefore in descending tuberculosis of one kidney with a competent kidney on the other side nephrectomy should be promptly performed.*

The 136 cases reported by Palet had so high a death rate that one would be slow to undertake the operation even on the above indications. When we come to analyze the deaths a different conclusion may be reached. Of the fifty-one deaths, seventeen died of anuria through disease and resulting incompetency of the other kidney. All of these cases could have been eliminated by the use of the ureteral catheters. Shock was the cause of death in eleven cases and usually in abdominal nephrectomy. The statistics are all against this method, which was used twenty-two times in Palet's series. In four cases death was due to unforeseen accidents, and in seven cases no postmortem was made.

In fifteen of Palet's cases fistula remained a long time, due, he thinks, to the tubercular stump of the ureter. On account of this unpleasant sequela and the danger which the tubercular stump might be, Howard Kelley's method of removing the ureter through the vagina should be used in all cases of nephrectomy for tuberculosis of the kidney in women.<sup>8</sup>

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<sup>8</sup> Kelley, H. A.: Nephro-ureterectomy, extirpation of the kidney and ureter simultaneously. Johns Hopkins Hospital Bulletin, 1896, p. 31.

This is done by following the ureter down with the fingers after tying of the renal vessels and bringing out the kidney. The stages of this operation are beautifully described and illustrated by Dr. Kelley. A reproduction of sketches of these pictures and a synopsis of one case will best give an idea of this exquisite procedure.

The patient was an unmarried woman, 23 years of age. As a child she began to complain of pain and weakness in the back, which compelled her at 9 years of age to remain in bed six weeks. She suffered from frequent urination, which was markedly worse after an attack of scarlet fever when she was six years old. For four years she has urinated so frequently that she could pass but a few drops at a time with great pain. A year ago she had an attack of spasmodic pain in the region of the left kidney, accompanied by vomiting and followed by pain in the bladder. These attacks have been frequent since, some time occurring as often as once a week. The attacks lasted from one to three hours.

Repeated examination of the urine showed it to be always acid, amber colored, containing albumin, pus, hyalin and granular casts, and had a specific gravity varying between 1.015 and 1.020. By vaginal palpation the left ureter was found transformed into a cord three times the normal size. On the right side the ureter was not sensitive and not enlarged. The left kidney could not be palpated. The left ureteral orifice was found by cystoscopic examination deeply injected and surrounded by an area of granulation tissue two centimeters in diameter and extremely sensitive to touch and bleeding easily. The ureteral catheter was passed into the right ureter and normal urine obtained, but it was found impossible to catheterize the left ureter, either by sight or touch. No tubercle bacilli could be found.

In view of all these facts it was nevertheless decided to remove the kidney and ureter and that portion of the bladder that seemed to be infected with the tuber-

cular disease. The operation was performed Dec. 18, 1895. The incision commenced just in front of the vertical muscles of the back at the costal margin and downward toward the middle of the ilium crest, and then in a gentle curve around the anterior spine and two centimeters from it and from this point in an oblique line downward to the lower terminus of the left semi-lunar line an inch above the symphysis pubis. The upper third of the wound was first made, the kidney detached, the renal vessels tied, the kidney removed and the ureter separated down to the pelvis. The lower portion of the incision was then made, the ureter freed with the fingers, the round ligament pushed aside, the uterine artery and veins ligated and divided, and the ureter clamped and tied two centimeters from the bladder. The kidney with ureter 23 centimeters long was then removed. The assistant then punctured the vault of the vagina and the lower end of the ureter was brought into the vagina as shown in Figs. 7 and 8. No ligatures were used except those on the renal vessels and the uterine artery and vein.

The pathologic examination demonstrated advanced tuberculosis of the kidney, but tubercle bacilli could not be demonstrated in the caseous material nor in the milky fluid in which it was suspended. The healthier portions were filled with many small white tubercles. The upper portion of the ureter showed a slight infiltration with leucocytes near slight defects in the mucous membrane.

There are reasons enough to make the following summary :

1. Tuberculosis of the kidney is a relatively common disease.
2. It usually begins in the kidney itself, descends through the ureter to the bladder and ascends to the opposite kidney.
3. It is, therefore, for a long time a unilateral disease.
4. It is a progressive and destructive disease not subject to improvement through medication, offering

an unfavorable prognosis as to life and comfort and subject to extension downward by the urinary tract and outward through the peri-renal lymphatics.

5. Diagnosis can be made through the symptoms of cystitis, with a low temperature, rapid pulse, dilatation of the heart, the detection of tubercle bacilli in the urine, tuberculosis of the bladder about the orifice of the ureter of the diseased kidney, pus or blood with tubercle bacilli and diminished normal constituents in the urine from the diseased kidney; normal urine in increased quantity from opposite kidney; sometimes tenderness, pain and tumor *in situ* of diseased kidney and ureter.

6. The indications in case of an absolute diagnosis of tuberculosis of one kidney and healthy opposite kidney are immediate removal of the diseased kidney *and its ureter*; in case of disease in both kidneys, no operation should be performed.

7. The competency of the healthy kidney should be proved by repeated catheterization of the ureters before nephrectomy and the removal of all toxic elements from the blood should be secured by a liquid diet, irrigation of the colon and hydration of the whole system for some days before the removal of the kidney.

8. Lumbar, extraperitoneal nephrectomy is the safer operation.

9. In women the removal of the ureter should be completed through the vagina.

10. Any remaining tuberculosis of the bladder should be treated locally by curetting or cauterization.

11. Catheterization of the ureter is not a dangerous procedure and it may easily be accomplished in women with the simple cystoscope of Simon, Pawlik or Kelley, and in men with the more complicated instrument of Casper.

#### PERSISTENT RENAL HEMATURIA.

There are still many dark chapters in pathology and clinical medicine. To one of these belongs the subject of this paper. It can only be illuminated by

calling the attention of the profession to the clinical features of these obscure cases and bringing to light the experience of the profession, which lies hidden in the literature and the note books. This paper tries to accomplish these two things and leaves for the fortunate pathologists the task of demonstrating the pathologic lesions of what seems to be a clinical entity.

Renal hematuria is to be distinguished from hemoglobinuria by the presence of blood corpuscles in the urine coming from the kidney in the place of urine stained with the coloring matters of blood.

The case here recorded and the collection of those relatively similar from recent medical literature seem to point to an unknown condition, or series of conditions, of which renal hematuria is the principal symptom. This condition has been met with in nearly all the hospitals of the world and it has been given, in the hospital reports, that clinical diagnosis, hematuria, which is so unsatisfactory to the pathologist. Thus, in the Berlin Charité, during five years ending 1893, there were 124,000 admissions, of which 22 received the diagnosis of hematuria. In the English reports this diagnosis is still more frequent.

Renal hematuria is common enough in injury of the kidney, in nephritis, in acute infectious diseases, in scurvy, in tuberculosis of the kidney and in calculus and new growths in the kidney. In the case before us the bladder showed no evidence of tubercular disease. The examination of the urine rejected nephritis and the examination of the blood excluded malaria. No detritus or formed elements, such as might reasonably be expected in cancer or other tumors could be found. No tubercular bacilli could be discovered in the sediment. The history had, to be sure, a distinct trend toward an acute local disease of the left kidney, but the condition of the urine from the two ureters pointed to a bilateral or to a constitutional disease.

This case, however, was carefully examined, the general conditions noted, the complete genito-urinary

examination made and the contraindications to the removal of the left kidney, required by the clinical diagnosis, were made imperative.

The study of hematuria should always be prosecuted with the greatest care and exactness. The possibilities of tuberculosis, tumor, cancer and calculus are such grave possibilities that no means of diagnosis can safely be omitted. The urethra should be dilated, the bladder examined with the cystoscope and the catheters passed into each ureter, and even up to the pelvis of the kidney.

The danger of producing a ureteritis or a pyonephrosis, by the use of the ureteral catheters must not be forgotten. Nevertheless no case is recorded in which an unfavorable result has followed ureteral catheterization in the hands of experienced and careful operators. Casper<sup>9</sup> reported before the Medical Congress at Wiesbaden, that in 250 cases, of both men and women, in which the ureteral catheters had been used by him no case of infection had occurred. This procedure, like every other surgical operation, should, however, be employed only when adequate indications for it exist, and should, when such indications are present, never be neglected.

*Synopsis. A multipara, 39 years old, with no history of hereditary or personal hemophilia; an acute painful attack in the left side accompanied with hematuria, which continued two years. This hematuria increased by exercise. A tender left kidney. Less than the normal amount of very bloody urine from the left ureter; more than the normal amount of less bloody urine from the right kidney; rest in bed and milk diet without improvement. Antisyphilitic treatment added; great improvement.*

Mrs. C., 39 years old, was placed in my care in St. Luke's Hospital on April 14, 1896. She was a thin, anemic woman. She had never had malaria. Her husband has had an uncertain venereal history. Her mother is still living, but has some sort of skin disease of an unknown character. Her father died from an operation for hemorrhoids. No history of hemo-

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<sup>9</sup> Berlin klin. Wochenschrift, Vol. i, 1896.



philia in the family. One sister died of acute pulmonary tuberculosis. The other members of the family are in good health. Menstruation began when she was 13 years of age and was regular up to the time of the present illness. She was married at 18 years, had one child now 16 years old, and some years later had a miscarriage. Her present illness began two years ago with pain in the left side in the region of the kidney and with bloody urine. She was sick in bed at the time with chills and fever for several weeks. She does not know whether the pain or the bloody urine appeared first. During this sickness poultices were applied to the left side and back. The pain has been almost constant ever since. Bloody urine has been the most pronounced symptom of the disease. It is greatly increased on any exertion. The patient has lost twenty-five or thirty pounds and now weighs about 100. She is excessively anemic. The heart's action is violent on the slightest exertion. No evidence of disease could be found in the nose, throat, eyes, ears, or lungs. There was no heart murmur, no lymphatic enlargement, no enlargement of the spleen or thyroid. Since this disease began menstruation has been irregular, sometimes missing two or three months and the flow has been very scanty and watery. On admission she was put on a milk diet, her temperature was 99 degrees F., pulse 72, respiration 22. Twenty-eight ounces of dark bloody urine of an acid reaction and a specific gravity of 1.016 was passed in twenty-four hours. No pus, casts or formed matter, except blood corpuscles, could be found in the sediment, which was precipitated by the centrifugal machine. Examination of the kidneys demonstrated a body moving with each inspiration in the site of the right kidney; in the site of the left a similar body could be felt much less movable and very sensitive to a rolling pressure. The examination was easy on account of the sparseness of the patient and the relaxed condition of the abdominal walls. The other abdominal organs seemed to be in normal position and of normal size. The spleen

was certainly not enlarged. The heart's apex was three inches from the median line, and while sitting, a little below the fifth interspace.

On April 14, the left ureter was catheterized and one cubic centimeter of urine, dark with blood, was collected in fifteen minutes. This urine after the removal of blood and albumin, contained 17 grams of urea to the liter. The right ureter was also catheterized. There were 10 cubic centimeters of bloody urine passed in fifteen minutes, containing 28 grams of urea to the liter. By vaginal examination the ureters could not be felt and they were certainly not thickened or enlarged. The interior of the bladder was pale as were all the other mucous membranes of her body. There were 3,500,000 red blood corpuscles per cubic millimeter in her blood. She had had several wounds, but never any symptoms of hemophilia.

It was evident from the examination that the discharge of blood in the urine was not a local disease and the anemia contraindicated the removal of the left kidney, which seemed to perform some little function. The patient was, therefore, put to bed on a milk diet and after a time of no improvement, antisyphilitic treatment was begun. During two months of this treatment the patient gained twenty pounds and the amount of blood in the urine was greatly diminished.

At a recent examination of her urine, about July 15, great improvement was noticed. The urine free from blood and albumin is high colored, 4 or 5 on Vogel's scale. There is about one-half the normal quantity in twenty-four hours, namely 500 cubic centimeters. The normal solids are also about one-half the normal average except uric acid which is relatively in excess and absolutely normal. The albumin is 0.2 per cent. by weight. The urea is 26 grams in twenty-four hours. There are no formed elements in the sediment except a few red blood corpuscles.

This is a very interesting case from the clear history of the disease of the left kidney, the large amount of blood in the urine and the almost absolute clinical



indications of a unilateral disease, which might be helped by the removal of the left kidney. The examination of the urine from the two ureters, however, seemed to me a complete contraindication to the operation as it demonstrated the same disease on the other side. The anemia also was a contraindication to any operation, which did not promise to entirely arrest the hemorrhage. The value of catheterizing the ureters is not better shown than by this case. Before any operation is undertaken on the kidney both ureters should be catheterized and the results compared with the combined urine for twenty-four hours.

The pathology of this case is undemonstrated. It is evidently not a case of malaria, as the blood examination and the small spleen plainly showed. There were no parasites in the urine. Neither ureter was enlarged. Enlargement of the ureter might be expected in suppurative or tubercular disease of the corresponding kidney. The fact that some improvement was made under antisiphilitic treatment might be considered by many a positive diagnosis, but to me this fact does not warrant the conclusion. There are many cases in the literature which resemble this one in nearly all particulars.

In December, 1890, Senator<sup>10</sup> presented before the Berliner Medicinische Gesellschaft an interesting case of renal hematuria. The patient was a girl 19 years old, who gave a history of hereditary hemophilia. The cystoscope showed that the blood came from the right ureter. Rest was tried without success. The kidney was exposed by lumbar incision and appeared normal. The hematuria was so great that extirpation of the kidney was considered necessary to save the life of the patient, which was threatened by the anemia. Sonnenburg, who was present, agreed in the conclusion of Senator to perform nephrectomy. When the kidney had been removed it still appeared normal. Microscopic examination

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<sup>10</sup> Senator, H.: Über renal Hämophilie. Berlin klin. Wochenschrift 1891, No. 1.

discovered the fact that the hemorrhage occurred inside Bowman's capsule and that the urinary tubules contained blood. In the discussion Senator referred to three other cases of a similar nature, one reported by Sabatier.<sup>11</sup> The patient was a woman 30 years old. Pain in the region of the kidney came on suddenly, with dyspnea, vomiting, strangury and bloody urine. The hematuria continued seven years. The patient gave a tubercular family history and had a cough. Repeated examinations showed tenderness of the right kidney, but no tumor. The other abdominal organs were perfectly normal. There was no gravel and no pus in the urine. During the year her case was under observation various diagnoses were made, namely, 1, tubercular kidney and rheumatism; 2, tubercular peritonitis and uremia; 3, paroxysmal hemaglobinuria; 4, nervousness, simulation, and 5, calculous nephritis. Oct. 16, 1886, Sabatier extirpated the right kidney. No stone was found and the microscopic examination did not demonstrate anything abnormal except a slight sclerosis. Sabatier considered the kidney perfectly sound. After forty-eight hours of bloody urine the last trace of blood disappeared and the patient recovered perfectly. Shede<sup>12</sup> is also quoted by Senator as reporting the following case: A strong, well man, 50 years old, with no hereditary taint, had very bloody urine for years, coming on after taking a cold drink. The bladder was found normal. The urine contained red and white corpuscles in their normal ratio to each other, but no other formed elements. Through a suprapubic cystotomy opening the two ureters were catheterized. This procedure showed that the blood came from the left ureter alone. Five days later, July 1, 1889, the left kidney was explored through a lumbar incision. It did not appear abnormal and nothing was found in the pelvis. It was, however, removed, but the microscopic examination demonstrated no adequate cause

<sup>11</sup> Sabatier: Néphralgie hématurique. *Revue de Chirurgie*, Paris 1888, p. 62.

<sup>12</sup> *Jahrsbücher des Hamburger Stadtkrankenhauses*, 1889.

of the hematuria. Lanphear<sup>13</sup> observed a case of hematuria in a man 55 years old, but he did not catheterize the ureters and made the diagnosis of renal hematuria by washing out the bladder with boric acid solution and finding the fresh injection clear.

Broca<sup>14</sup> recites a case which is interesting in this connection. The patient, well until the present illness, was confined two years before with a perfectly normal puerperium. She served nineteen months as a wet nurse. Menstruation began nine months after confinement. In July, 1890, one month after weaning the child, hematuria appeared with indistinct pain in the right side. This advanced little by little with increasing pain in the right lumbar region; in the left side there was only occasional tenderness. After thirteen months of hematuria, very great lassitude appeared. One physician diagnosed a downward displacement of the kidney, a truss was worn without improvement. Sixteen months after the beginning of the hematuria Broca first saw the patient and on strong pressure only could tenderness of the right kidney be demonstrated, but no enlargement or displacement. There was no colic. The urine was uniformly mixed with blood. There was frequent and painless micturition. The patient was in good condition and had a good appetite. A most careful examination of the urine gave no evidence of tuberculosis and no evidence of carcinoma. Rest in bed and a milk diet were tried without effect on the hematuria, which lessened a little during menstruation to increase again after it was over.

On Dec. 17, 1891, the kidney was laid bare through a lumbar incision, peeled out of its fat capsule and brought to view in the wound. Inspection and palpation failed to demonstrate anything abnormal. Exploratory nephrotomy revealed nothing more. This diagnosis was confirmed by Hartmann and Terrier, who

<sup>13</sup> Lanphear, E.: An Obscure Case of Hematuria. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Chicago, 1894, vol. 22, p. 117.

<sup>14</sup> Broca, A.: Hémophilie rénale et hémorragies rénales sans lésion connue, Ann. malad. des org. genito-urin. December, 1894.

stood by. The kidney and wound were closed, the latter without drainage, and recovery followed. The first urine passed after the operation was bloody, after that there was no more hematuria and no more tenderness in the right kidney. The patient was seen occasionally for three years and she remained perfectly well. It would have elucidated this case if the ureters had been catheterized. We do not know that the blood came from the right kidney alone.

Passet<sup>15</sup> describes an interesting and obscure case of renal hemorrhage in a woman who had four children. The first attack came on after menstruation and the next one six months later. It was considered a case of vesical hematuria and was treated by injections of nitrate of silver solution. Cystoscopy was impossible on account of the hemorrhage. Digital exploration discovered a small tumor (?). Suprapubic cystotomy was performed and the bladder found perfectly normal in appearance, the ureters were catheterized and the blood found to come from the right ureter alone. On account of the anemic condition of the patient it was not thought best to do nephrectomy at once. The bladder was sewed up and the patient recovered. The urine became clear and continued so for two years, when a transient attack of hematuria came on again. No similar attacks appeared during the following year during which she was under observation.

A somewhat similar case is reported by Stavely.<sup>16</sup> The patient was a multipara, 39 years old, who noticed blood in the urine two months after the birth of her last child. It was intermittent, but at last it came on every other week. She was anemic, 3,172,000 red, 10,000 white corpuscles per cubic millimeter of blood. The urine was very bloody and contained 110,000 red blood corpuscles per cubic millimeter of

<sup>15</sup> Passet, J.: Über Hämaturie und renale Hämophilie, *Centralb. für die Krankheiten der Harn- und Sexual-organe*, v. 5, p. 397-405.

<sup>16</sup> Two cases of Hematuria with catheterization of the ureters and exploratory nephrotomy, *Johns Hopkins Hospital Bulletin*, March, 1893, p. 25.

urine. No tubercle bacilli could be found in the urine. The bladder was found clear, the left ureter was catheterized and 10 minims (.66 cubic centimeters) of reddish yellow urine containing blood corpuscles was passed in five minutes. This was repeated on the following day, but it was not possible to pass the sound into the right ureter in the ordinary manner. An incision was therefore made in the base of the bladder and the right ureteral orifice exposed and catheterized. The urine from the right kidney contained a trace of blood, the wound in the bladder was closed with silk-worm sutures. The left kidney was then exposed and explored by a deep incision into the back of the kidney down to the pelvis. No disease could be found. The wound was closed. The patient recovered and the hematuria disappeared.

The second patient was probably 35 or 40 years old had borne children. A year ago she suddenly developed hematuria without any known cause, which hematuria had continued, with slight exacerbations ever since. The urine had a specific gravity of 1.020. It was slightly acid and contained quantities of blood but no casts. The ureters were catheterized simultaneously by touch. The bladder was full of methyl blue solution at the time. In fourteen minutes, 20 minims (1.3 cubic centimeters) of dark bloody urine was obtained from the left kidney and 10 minims (.66 cubic centimeters) of clear amber urine free from albumin from the other. The left kidney was exposed and incised along its back while the renal vessels were compressed between the thumb and finger, but no disease could be detected. The kidney was closed with gauze drainage. The wound was also closed. The amount of blood in the urine gradually disappeared until the fifteenth day after the operation, when it was all gone and never returned.

Denny<sup>17</sup> of St. Paul, Minn., reports a case of persistent hematuria and uses its ultimate recovery without operative procedure as an argument against early

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<sup>17</sup> Boston Medical and Surgical Journal, Vol. 132, p. 183, 1895.

operation. It would be more logical from these data to insist upon an exact and absolute diagnosis. The history is very clear, but no positive diagnosis was made and as the man, who was 39 years old recovered promptly with vesical injections of nitrate of silver solutions, and has since remained well, it is possible that he suffered from hemorrhage of the bladder.

1. Renal hemorrhage can be demonstrated only by the catheterization of the ureters and kidneys, and these procedures should always be accomplished before nephirotomy or nephrectomy. The Pawlick or Kelley instruments may be used with females, but the Casper or Nitze instrument must be employed in males.

2. The patient should undergo a most careful observation in the hospital and a protracted rest in bed with a milk diet before an exploration of the kidney is made.

3. There is some unknown pathologic condition of which hematuria is a symptom, which has not yet been explained, and this condition seems to be relieved in some cases by nephrotomy and in others by palpation of the exposed kidney.

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### RENAL CALCULI.

In this series of cases none are more interesting from a surgical or from a pathologic standpoint than those in which calculi were found. The imagination is at once aroused to conceive the various causes of renal calculi, and the ingenuity is taxed at each effort to diagnose the condition and afterward to treat the case in the wisest manner in the emergency of the operating room.



FIG. 9.—Mrs. D. Diagram of abdomen made before operation, showing the location of the tumor as outlined by palpation and percussion.

*Occasional attacks of pain in the right side of the abdomen in a multipara for twenty-five years. Insignificant renal and urinary symptoms. No interference in the general health. At last at 63 years of age suppurative pyelitis. Nephrotomy and removal of the stone, drainage of the kidney for four weeks. Closure of fistula.*

Mrs. D., age 63, widow, was treated by me in St. Luke's Hospital on March 25, 1896. She had complained for some time of a pain and tenderness in the right hypochondrial region and had had a great many attacks of pains in this region during the past twenty-five years, which had been termed by her attending physicians liver complaint and congestion of the liver



indiscriminately. These attacks had usually lasted five or six days and had been relieved by rest in bed and a light diet with the use occasionally of narcotics to lessen the pain. Otherwise she had not been sick but had constantly suffered from frequent and sometimes painful urination though this had not been a marked symptom of the fore-mentioned attacks. Upon admission she complained of great pain in the right hypochondrial region and a very irritable bladder, loss of appetite and diminution of strength. Dr. Mary Bush, of Rogers Park, had seen her and had

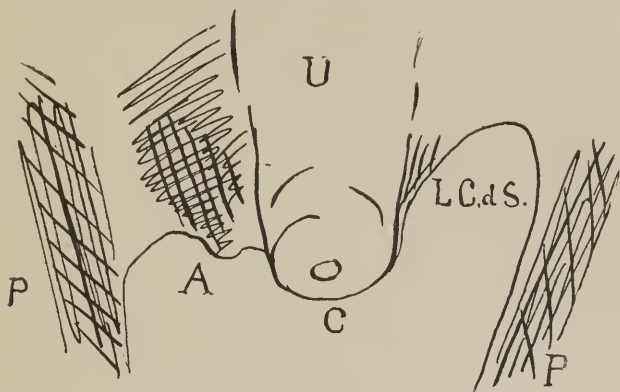


FIG. 10.—Diagram of the vaginal and rectal examination. U, uterus; P, wall of pelvis; LC d S, left cul-de-sac; A, thickened mass in right cul de-sac.

made a diagnosis of pyonephrosis of the right kidney. Upon examination the lungs were found normal and the heart slightly enlarged, the apex beat three and one-half inches from the median line in the fifth interspace. The patient was rather fleshy weighing 160 pounds and somewhat anemic. The spleen could not be palpated and the area of hepatic dullness was increased about one and one-half inches. In the right abdominal region was found a large and smooth tumor extending about two inches above the level of the umbilicus and three or four inches downward toward the brim of the

pelvis. This tumor was very tender on pressure and practically immovable. Examination through the rectum and vagina outlined in its normal position a somewhat atrophied uterus. The right cul-de-sac was lower than the left and seemed to be filled with tissue that was tender on pressure and extended as high as palpation could be made. The condition is represented in the accompanying sketch (Figure 10) which was made at the time. Examination of the urine showed it to be cloudy and reddish, of which fourteen ounces were passed in twenty-four hours, specific gravity of 1.022, slightly acid containing a small amount of albumin and 20 grms., of urea to the liter, or 10 grms., per day. This urine contained considerable pus and some epithelium. Upon admission her temperature was 99.2 degrees, pulse 80 and her respirations 26 per minute.

On the second day after admission the urethra was dilated, the patient put in the knee-chest position, the bladder distended with air and a ureteral catheter passed into the left ureter. Four cubic centimeters of urine passed from this ureter in fifteen minutes. This urine was free from pus, albumin and casts. It contained a large amount of urea, 40 grams per liter.

Although the catheterization was readily accomplished the patient was so exhausted by this procedure that no attempt was made at this time to catheterize the right ureter. On the following day, however, the catheter was passed into the right ureter but nothing escaped the catheter except a small amount of thick greenish pus. The catheter was removed, washed and reintroduced without any other result. No long flexible catheter was at hand and the indications were considered complete for the removal of the fluid which evidently filled the right kidney. On the evening of the fourth day several small doses of calomel were administered and on the morning of the fifth day the bowels were moved with an enema and the patient anesthetized on the morning of the sixth day. The temperature at that time was 98.6 degrees F.,

pulse 72 and the respirations 20 per minute. Chloroform was given by Dr. D. H. Galloway and Dr. Bush and Dr. Clark assisted. The operation lasted forty minutes. A median incision was made into the abdomen for digital exploration. A large, hard, rough and nodular kidney was found floating in the abdomen. The patient was then turned upon her side and the ordinary curved lumbar incision made. Even with a finger in the abdomen, great difficulty was experienced in holding the kidney into the lumbar wound. The wall of the tumor at its thinnest point was punctured with the scizzors and a hard stone felt surrounded by about six ounces of watery pus. The opening into the kidney was enlarged and a stone two and one-half inches long and one and one-half inches in diameter was extracted with some difficulty. It was found necessary to crush it with strong forceps and remove it piece by piece. It seemed to occupy the entire pelvis of the kidney and had no fassets behind it indicating the presence of other calculi. The cavity was explored with the finger but no other stones found. The ureter was somewhat dilated, but the thickness of the wall of the kidney seemed to suggest the presence of enough kidney substance to be useful in secreting urine. The edges of the pelvis were grasped with forceps and the pelvis itself packed with iodoform gauze inside of the Mickulicz handkerchief. A portion of the lumbar incision was closed with sutures and the abdominal opening completely closed and dressed. The patient was put to bed in good condition. Her pulse during the afternoon and evening ranged from 59 per minute directly after the operation with a temperature of 97 degrees F., to 80 per minute with a temperature of 98 degrees F., and respirations 28 per minute. There was a good deal of oozing from the wound but it was of a very pale and watery character and showed no tendency to the formation of clots. When burned in the flame it gave off a urinous odor. On the fifth day after the operation the discharge was almost entirely urinous and saturated the

dressings with six ounces in twelve hours showing considerable activity in the kidney.

The accompanying temperature record (Figure 11) shows the uneventful progress of this case. The patient left the hospital on April 26 with the wound not yet entirely closed, but all urinous discharge had ceased for several days before. A few days afterward a fragment of stone was discovered in the wound and removed. Since this event and up to this writing (March 1897) the wound has completely closed, the patient is gaining in strength and the urine seems entirely free from pus and albumin.

This case illustrates the way large calculi are borne by the kidney. For many years the symptoms were so slight as to be hardly noticed. There were of course occasional attacks of pain but they did not last long. At last the ureter became partially obstructed and the symptoms were more pronounced. The case also illustrates the possibility of demonstrating the adequacy of the opposite kidney before operation. The scanty urine that was removed from the left ureter contained an excessive amount of urea and pointed at once to its health and the need of a larger amount of water to carry away the urea. Incidentally also this case shows the possibility of performing the most serious operations upon very old persons, even under such unfavorable conditions as attend the destruction of a kidney. Operations as serious as nephrotomy have been successfully performed on octogenarians.

Nephrectomy was thought of in this case, but the result shows that it is better to leave behind rather than remove remnants of a suppurating kidney provided there is no obstruction in the ureter. If necessary the kidney may be removed at a subsequent operation after the patient has recovered from the sepsis and the effects of the pain.

There are many cases of calculus which give rise to no symptoms and are only discovered postmortem. In many cases also small calculi pass into the bladder

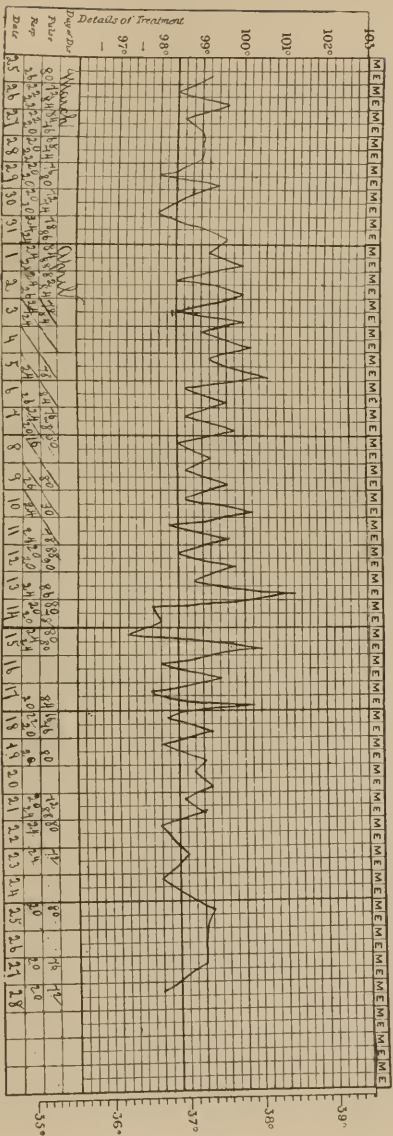


FIGURE 11.

at intervals with dreadful pain. It is sometimes possible to follow such a stone along the ureter by the point of tenderness and at last with the cystoscope see it borne into the bladder as I have once done in a man, using for the purpose a Casper ureter-cystoscope. It is often possible to prove that the stone has been discharged into the bladder by using the cystoscope. This I have done and after making a drawing of the small stone with a bloody end my patient did me the kindness to urinate and demonstrate the accuracy of my observation by passing the calculus which had irritated his prostate for several days.

Many cases of calculus of the kidney are not surgical cases at all and become surgical only when they have gone on to suppuration or to such excessive pain as to interfere with health.

#### CONGENITAL ERRORS IN THE DEVELOPMENT OF THE KIDNEYS AND THEIR ADNEXA.

There are many errors in the development of the kidneys which are of great surgical and pathologic interest. Most of these errors are easily explainable by the remarkable evolutions which attend the development of the urinary apparatus. If any one doubts the utility of a careful study of this subject, let him contemplate the feelings of the surgeon who has removed the only kidney a patient possessed, or of one who has explored the loin and found no kidney below the supra-renal capsule.

Congenital errors in the development of the kidney occur with about the same frequency as do malformations elsewhere in the body. In 13,478 autopsies, one kidney was entirely absent in 4 cases, and atrophic in 59 cases. Klebs places the ratio of the absence of the right kidney to that of the left as 7:2, while Beumer thinks there is no difference in frequency.

The malformations of the kidney which are macroscopic in kind are logically separated into *a*, anomalies in form or size and, *b*, anomalies of position.



The normal size, form and position can be learned from any text-book of anatomy.

1. *Absence of both kidneys*.—Only in non-viable children are both kidneys absent. This malformation is usually accompanied by defects in the abdominal wall, in the wall of the thorax or in the cranium and its contents. Acephalus and anencephalous monsters are often without kidneys. In some cases where the head and thorax are perfectly developed the pelvis and lower extremities are deformed and the kidneys entirely absent. Bécларd considers the development of the kidneys related to the development of the lumbar vertebral segments and therefore to the development of the lumbar vertebræ and cord. Meyer of Bonn, describes the following stillborn child, which is a case illustrating this connection of development.

The lower extremities were contracted and the toes were rudimentary. The external genitals and the rectum were absent, and the anus opened into a small skin-covered sack. The intestine ended at the descending colon in a blind sack. The kidneys were both absent and the adrenals (supra-renal bodies) both twice the normal size. Both renal arteries were absent, as well as both ureters and the bladder and urethra. Near the adrenals were the small testicles and their epididymus. All the other abdominal and the thoracic organs were normally developed. The spinal cord ended at the twelfth dorsal vertebra. The coccyx and the lowest sacral vertebra were absent. The skull was unusually fattened from the forehead to the occiput. In the right eye there was a congenital cataract. The brain was much compressed and its cortex was almost as hard as cartilage.

A curious report was made by Moulon of Trieste, of a postmortem examination of a girl fourteen years old, who discharged her urine through an umbilicus just above the symphysis pubis. Moulon could find no kidney at all and he concluded that the urine was secreted by the umbilical vein! In commenting on



this slovenly observation, Rayer concludes that it was a case of ectopy of the bladder in which the kidneys or kidney was overlooked.

Occasionally in unviable children both kidneys and the urinary bladder have been found but wholly unconnected on account of the complete absence of the two ureters. Such an observation was recently reported by Friderici.

2. *Complete absence of one kidney.*—The absence of one kidney arises either from the suppression of one kidney matrix or anlage, or by the coalescence of the two matrices with one another. Morris calls the former condition the unsymmetrical kidney and the latter the solitary kidney. He also makes another distinction when one kidney is represented by some remnant. This he calls the atrophied kidney. It would really seem better to call that kidney a solitary kidney which is formed from a single matrix and of normal proportion and parts, the other kidney being absent; and to call that kidney a coalesced kidney which is formed by the union of two matrices, having more than one artery or vein, or ureter. These anomalies are consistent with life.

The complete absence of one kidney is usually accompanied by the absence or defective development of the ureter, the seminal vesicles, the cord and the testicle on the same side or in women of corresponding sexual organs. The supra-renal body does not usually share in these defects, but is present and even enlarged where the kidney is absent. Morris found it absent in one out of ten cases where the kidney was absent. The solitary kidney (the unsymmetrical kidney of Morris) is usually hypertrophied, is larger and heavier than normal, and is sometimes supplied with accessory arteries, veins or ureters; but occasionally the solitary kidney is smaller even than the normal. One such case at least has been reported by Wrisburg, in whose patient the skin took on the function of the kidney and the perspiration had a urinous odor (Halder's "Physiology").

We do not yet know just how radical the hypertrophy of the solitary kidney is. Some investigators hold that the absolute number of glomeruli is greatly increased, even doubled, while others have not been able to verify this observation.

We do not know yet whether the solitary kidney is more or less liable to disease than one of a pair of kindneys. It certainly would seem *a priori* that it is no advantage to a patient to have a solitary kidney.

The following interesting cases may be useful in getting an idea of this malformation:

Chaffrey, W. C.—Solitary kidney. (Transactions of the Pathological Society of London. Vol. 36, 1885.) In a boy five and a half years old, dead of tuberculosis, the normal left kidney was normally placed, but the right kidney was entirely absent. This kidney was  $4\frac{3}{8}$  inches long,  $1\frac{5}{8}$  inches broad and weighed  $4\frac{3}{8}$  ounces. The ureter had a diameter of  $\frac{3}{8}$  of an inch. It traversed the wall of the bladder less obliquely than usual and opened near the middle line by a slit-like aperture.

Prudden, T. Mitchell.—Congenital absence of left kidney, (N. Y. *Medical Record*, Vol. 29, p. 314.) The man died of tuberculosis of the lungs and tubercular meningitis. There had been no renal disease. At the postmortem, the left supra-renal gland was found in about its normal size and position, but there was no left kidney or ureter or renal artery to go with it. The right kidney was slightly larger than normal.

Wood, J. W.—Absence of one kidney and carcinoma of the other. (N. Y. *Medical Record*, Vol. 29, p. 625.) A little girl three months old died after suppression of urine for five days. At the autopsy, the left kidney was absent, and the right was at large mass adherent to the intestines all about and cancerous. It was five inches long. The ureter was seven inches long and greatly dilated.

This might have been a case of epithelioma growing out of a matrix of supra-renal body left in the kidney (Grawitz).

3. *The incomplete development of one kidney.*—The growth of one kidney is sometimes arrested in early fetal life. Then the ureter leads to a small pelvis to which a few urinary canals open or none at all. The renal artery is either absent or very small. The opposite kidney is hypertrophied. The atrophic condition is sometimes confined to a part of the kidney. Some-

times two or more pyramids are normal and secrete normal urine (Morris) and sometimes only one pyramid (Birch-Hirschfeld). There are also anomalies in the formation of the calices which may result from the hypertrophy of existing pyramids or the coalescence of two or more pyramids.

A common arrest of development shows itself in the so-called "fetal kidney." The kidney is then of normal size and weight, but is divided into several lobules, 5-10, as in the fetus and in the cow. These kidneys have a normal function. The divisions are not very deep and are held together by the fibrous tissue which forms the capsule. The divisions of the fetal kidney resembles somewhat scars left from



FIG. 12.—The left kidney in its fetal condition. (Kuster.)

destructive disease of the cortex. It is very possible that the fetal kidney is more liable to disease than the mature organ, especially to cystic atrophy through valve formation (Fenger). It has been noticed also that fetal kidneys are prone to tubercular disease (Küster).

Wolkowitsch (1895) describes an interesting case of rudimentary kidney in a surgical case. The patient was a man 49 years old with a pyuria six months after typhoid, for which the left kidney was examined by lumbar incision. There was an abscess in the lower end as large as an apple which was opened and drained. The abscess was thought to be

tubercular. The upper pole of the kidney was also opened. The patient died of uremia on the twelfth day. At the autopsy the large left kidney was found full of small abscesses. The right kidney was rudimentary, 4 cm. long, cystic and suppurating. The right ureter was impervious except the last 2 cm., where it opened into the bladder. Both vasa deferentia ended 20 cm. from the bladder, blind behind the peritoneum. The right seminal vesicle was absent and the left small and empty. The right testicle was small.

4. *Supernumerary kidneys*.—Such a thing as a supernumerary normally formed kidney is still a matter of tradition or speculation. Depage describes such

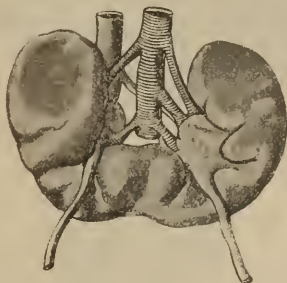


FIG. 13.—A typical horseshoe kidney viewed from before. From the Marburg collection. (Kuster.)

a case. A tumor in the abdomen was removed and found to be a kidney. The two normal kidneys were found in the normal locations. The right one was so movable that it was sewed back in place. The older authors have reported similar cases, but no specimens are, so far as I know, at hand to support these observations. The possibility of a teratoma kidney-like in structure without function should not be forgotten in considering Depage's case.

5. *Coalesced kidneys or horse-shoe kidney*.—This is the most common of all congenital malformations of the kidneys. It occurs once in about 1,000 autopsies. It presents itself typically in a blending

together of the lower poles of the two normally placed kidneys, making one large horse-shoe shaped organ. The accompanying drawing is from a specimen in the museum at Marburg.

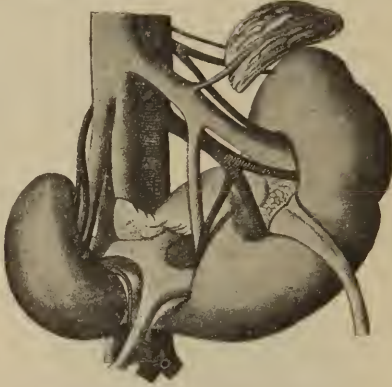


FIG. 14.—An irregular horseshoe kidney from the Marburg collection. Notice the right ureter. (Kuster.)



FIG. 15.—A sigmoid kidney. The right and left kidneys united by their lateral borders. (Brösike after Kuster.)

Very rarely the union between the two kidneys takes place through the blending of the upper poles, making the kidney concave downward. The ureters

are frequently more than two. The blood vessels are also more numerous than normal. The union of the two kidneys is sometimes only fibrous. Such a case is to be found in Report of Guy's Hospital, 1880, and frequently elsewhere in the literature of medicine. The two kidneys are sometimes united into a long kidney lying on one side of the spine. *Ren sigmoid-*

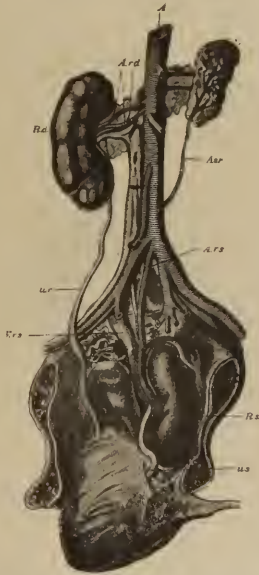


FIG. 16.—Congenital displacement of left kidney in left pelvis. (Rayer.) A, aorta; A.r.d., the double artery of the right kidney; R.d., the right kidney; u.r., the right ureter; V.r.s., the left renal vein; A.s.r., the left adrenal artery; A.r.s., the left renal artery; R.s., the left kidney; u.s., the short left ureter.

*eus* or *ren elongatus simplex*. And again they are united into irregular masses. These peculiar combinations have received many descriptive names. *Ren scutaneus*, *ren informis*, etc.

Freund (*Arch. f. Gyn.*, Vol. 8, p. 538) found in an old woman with absence of the uterus, a tumor which he recognized through the vagina as a horse-shoe kid-



ney. The diagnosis was made more certain by the absence of the kidneys from their normal positions. The abdomen was so lax that they could have been easily felt. The hilus lay forward, which position is a rare one, remarks Freund. Out of twenty cases of horse-shoe kidneys only one lay with the hilus forward.

6. *Congenitally displaced kidneys*.—One or both normally formed kidneys are occasionally found congenitally displaced and so more frequently are malformed or coalesced, horse-shoe kidneys. The horse-shoe kidney is usually displaced, the united ends necessarily so. The displaced kidney is usually



FIG. 17.—Congenital cystic kidney of a newborn child. Two-thirds natural size. (Orth.)

found in the pelvis, especially at its brim. It has a short ureter and also an unusual number of arteries coming from the adjoining trunks, the iliac, the hypogastric or the crural. In women such a displaced kidney may produce dystocia and in men it may give rise to errors of diagnosis. Runge (*Arch. f. Gyn.*, Vol. 41, p. 99) describes a case of congenitally displaced kidney which it is worth while to remember. A woman had given birth to seven children all living except the fifth which was stillborn, being a transverse presentation and artificially delivered. In the third or fourth month of the eighth pregnancy three tumors were found in the abdomen. The pregnant



uterus, a tumor of the right ovary and the left kidney. The tumor of the ovary was removed by laparotomy. The kidney was found immovable on the pelvic wall, the hilus upward. The child was delivered artificially with a fractured humerus. Two arteries could be felt in the kidney. Only three other cases like this are reported.

Strube, Georg.—“Ueber congenitale Lage-und Bildungs-anomalien der Nieren.” (*Archiv für pathologische Anatomie und Physiologie und für klinische Medicin*, 137, p. 227.) This case presented an absence of the right kidney with the left kidney in the pelvis. It was in a patient 32 years old, who died of an acute nephritis due to laparotomy, undertaken to remove a tumor, which proved to be the movable kidney. Both supra-renal capsules were found of their normal sizes and in their normal places, with a normal blood supply. The only kidney present lay between the fourth lumbar vertebra and the second vertebra of the sacrum. It was twelve centimeters long, eight centimeters wide and four and one-half centimeters thick. It lay in the pelvis especially toward the left side, so that it covered the left iliac vessels. Its highest point was at the bifurcation of the aorta; its lowest point rested deep in the pelvis. The kidney was lobulated. The pelvis of the kidney was made up of four calices, two of them small and two of them large. The ureter was eleven centimeters long and very much dilated. It passed behind the rectum on the left side of the vertebra into the bladder. On the right side of the kidney was a piece of tissue four centimeters long by two or three centimeters wide. It showed upon examination to contain a few glomerules with a colloid mass. From this passed a cord, evidently an obliterated ureter, toward the bladder, about its normal position. The kidney was supplied by two arteries and two veins. The supra-renal artery arose one and one-half centimeters from the bifurcation of the aorta and entered the right upper part of the kidney and distributed itself by means of two branches. The lower renal artery arose from the left hypogastric and passed directly into the hilum. The renal vein emptied into the left common iliac vein.

Somewhat similar cases have been reported by Chapuis (*Lyon Médical*, 1895), Goullioud (*ibid.*), Fischel (*Prager med. Wochenschrift*, 1895), and the older authors referred to by them.

7. *Congenital cystic kidney*.—Congenital cysts of the kidney seem to be related to other malformations usually inconsistent with a viable child, so that only

a few of these kidneys require surgical care. The blood supply of the cystic kidney is usually very small. The ureter remains patent, which easily distinguishes it from hydronephrosis. The cysts are sometimes of enormous size, in the fetus interfering with labor and after birth making respiration impossible or difficult. Many of these children with cystic kidney live a few days or a few weeks and then die of exhaustion; others live and come to surgical interference.

Sutton, J. Bland.—“Tumors, innocent and malignant.” Philadelphia, 1893, p. 253. Sutton copies a sketch from H. Morris which is reduced and presented here. It represents a congenital cystic kidney. Some of the cortical substance is left between the cysts. In typical cases like this, the kidney is

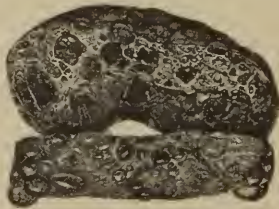


FIG. 18.—Cystic Kidney. (Morris.)

converted into cystic masses, so that on section the appearance of a sponge is presented. The cysts vary greatly in size. Some of these project from the surface of the kidney. In early stages they have a covering of epithelium which is difficult to find in advanced cases. Sometimes the renal pelvis is easily recognized, but later it becomes filled with fatty matter. The ureter is usually extremely narrow, but always pervious throughout. The blood supply in the cystic kidney is always very small. Congenital cystic kidneys sometimes attain an enormous size, so large indeed as to seriously impede labor, and necessitate the destruction of the fetus to enable delivery to be effected. Other congenital defects are usually associated with cystic kidney.

8. *Congenital malformation of the pelvis and ureter.*—One of the most common malformations of the kidney, and one consistent with life and the function of the kidney, is the double or treble pelvis or ureter.

It is perfectly natural to expect, in cases of lobulated or fetal kidney, to find one lobule so separate from the other lobules as to require a separate pelvis. If this occurred early in kidney development, then the ureter also might be found double. As a matter of fact, the division of the pelvis and ureter has been found in every grade of division which theory would suggest, from simple division of the pelvis to com-



FIG. 19.—Showing a section of a kidney with a double pelvis and two ureters for a part of the way to the bladder. (Rayer.)

plete double ureter and double pelvis on both sides of the body. The doubling of the ureter is by no means a rare malformation. It is said to be found, more or less complete, in one out of every thirty-five post-mortems. (Böstrom.) This frequency has not been sustained by other pathologists, perhaps because they have not been careful in examining the ureter. Malformations of the pelvis and ureters are certainly very

dangerous to their bearers. Double ureters are apt to become obstructed and dilated and precipitate suppurative disease. They are much more apt than single ureters to be abnormally placed in the bladder and become obstructed by valve formation. They stand also as a constant terror to the diagnostician who would discover the competency, the health or the disease of a kidney through the act of catheterizing the ureters.

9. *Malformations of the adrenals or supra-renal capsules.*—Complete absence of the adrenals is observed only in cases of unviable malformation, usu-



FIG. 20.—Double ureters complete on both sides. (Rayer.)

ally with defects in the head. Zander has observed absence or aplasia of the adrenals in connection with malformation of the genitals in nineteen out of fifty-six cases of this malformation. Enormous development of a supra-renal capsule has been observed with the complete absence of the corresponding kidney. The two adrenals are often united into one, especially in horseshoe kidney, and occasionally they are displaced with the kidney in the pelvis.

A remarkable error is found in remnants of the supra-renal body in the substance of the kidney itself. From this displaced tissue paratheliomas of the kidney

are thought to grow (Grawitz). Such displaced fragments of the adrenals have been found in the broad ligament, the posterior abdominal wall, the spermatic vessels (Marchand), and between the head of the epididymis and the testicle (Dagonet). All of these conditions are to be explained by the early association of the matrix of the spermatic apparatus with the adrenal matrix before the descent of the testicle into the scrotum. This is a subject of such clinical importance that it will be considered later at length.

## PARANEPHRITIC ABSCESS.

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[Reprinted from the North American Practitioner.]

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It is unusual in so small a clinic as mine to meet two cases of paranephritic abscess in so short a time. Although this disease has long been recognized as a distinct entity, it is relatively rare. In the reports of Cook County Hospital for the year ending Dec. 1, 1891, it is given as occurring in that large clinic of eight thousand patients a year, only three times, all men. Socin, in twenty-four years ending in 1893, in his clinic at Basel, saw only four cases of undoubted paranephritis out of a total of 15,651 surgical cases. During twenty-four years ending in 1894 Kuster observed the same number of cases in a clinic of 19,847. Combining all these statistics we have a total of eleven cases of paranephritis out of a total of 43,498 surgical cases, or 4,000 surgical cases to each case of paranephritis. This shows the rarity of a disease which is relatively well known and easily recognized.

Kuster has collected 208 cases of paranephritis, of which 140 were males and 68 females. From this it would appear that the disease occurs twice as often in men as in women. Both of my cases happened however to be women, although my practice includes a rather larger proportion of men; in one year, 82 per cent.

Kuster gives a table of the ages of his patients, showing a distribution in the decennia of life from the first to the eighth as follows: 24, 17, 42, 48, 28, 13, 5, 2; total 179. This shows that the great proportion of cases occur in persons between twenty and forty. It seems remarkable that so many cases have been observed before the tenth year of life. The youngest patient was  $1\frac{1}{2}$  years old and the oldest 75.

Out of 197 cases collected by Kuster 102 were about the right and 93 about the left kidney. Two were on both sides at once.

Kuster gives an interesting table showing the supposed causes of the disease.

Causes unknown, 67.

Contusion of the loin, straining, wrenching, 42.

1. Contusions and wrenching, 24.

2. Gunshot wounds, 4.

3. Muscle strain, 7.

4. Lifting, 7.

Foreign body in the kidney, 33.

Calculi, 31.

*Strongylus gigas*, 2.

Suppurative diseases of kidney, and its pelvis, all forms, 28.

The character of the infection has been studied in many cases and the ordinary forms of suppuration found. The bacillus coli communis is more frequently observed on the right than on the left side, possibly on account of the proximity of the appendix vermiformis. Streptococci, staphylococci and pneumococci are however much more common.

The disease has occasionally been traced by the character of the infection to distant foci, thus supporting the notion of metastasis.

During the past year it has been my good fortune to observe two cases of paranephritis.

*Case 1.—Cystitis and pyo-uria for three months; chills, fever and pain in the region of the left kidney for three weeks; large fluctuating tumor reaching into left inguinal region filling the loin. Incision drainage; recovery with fistula.*

Mrs. D., age 43, had for some months been troubled with pain in the back, which gradually located itself in the left side. She was a nervous, active woman, the mother of several children. For three months she had symptoms of cystitis and during the latter part of the time there was pus in the urine. There had been a slow rise of a septic temperature for three weeks when I was called in consultation by Dr. M. W. Bacon. The temperature had reached 103 degrees F. that day. There was a small amount of pus in the



urine which I examined. The bulging in the left loin was very evident and by percussion, auscultatory percussion and palpation a tumor 20 cm. long, reaching from the twelfth rib to the inguinal region, could be marked out. It fluctuated only indistinctly. The patient was put in the knee-chest position, the urethra cocainized and the cystoscope introduced. The bladder showed evidence of cystitis. The opening to left ureter was surrounded with granulations that easily bled. The right ureter was catheterized and 8 c.c. of clear urine free from pus containing 22 grms. of urea per liter was removed. The opening to the left ureter could be seen, but no catheter could be passed. The urine oozed out of this ureter at irregular intervals. The heart's apex was found 2 cm. to the left of the normal, but there was no valvular lesion.

A diagnosis of pyonephrosis with possibly secondary paranephritic abscess was made and drainage and possible nephrotomy or nephrectomy recommended.

On the following day an attempt was made to meet these indications. The patient was anesthetized with chloroform by Dr. D. H. Galloway. With the assistance of Dr. Bacon, I made the ordinary S-shaped incision, beginning at the end of the twelfth rib. As soon as the fascia was cut through, a large amount of pus, which was found to be streptococcus pus, poured out. When the hand was passed into the back the kidney was felt almost completely detached from the peri-renal fat. It was loosened from the adrenal and brought up for examination, but no evidence of disease could be found. It was not noticeably enlarged, the capsule was intact and it contained no stone. The kidney was therefore left in place. The cavity was drained. Operation Nov. 4, 1896.

The patient did well and recovered very rapidly, but still has a small sinus which does not close.

*Case 2.—Pain in the back for four weeks. During the past week low temperature and local pain in right loin. No urinary or bladder symptoms. Drainage of paranephritic abscess. Complete recovery.*

Mrs. P., age 35, the mother of one child, has a tubercular appearance, but is in good physical condition. She is a delicate, refined, high-strung woman, who has never been either well or sick, but has always overworked at all sorts of charities and clubs. She attended a wedding in the country four weeks ago and slept in a cold room. She was chilled and uncomfortable all night. On returning home she had lumbago in her right side, but this was not severe enough to prevent her doing all sorts of public work. She was down town in classes and at lectures nearly every day. A week ago the pains increased and a tumor in the region of the kidney was observed. Dr. Rachel Hickey Carr was called. She found a low temperature, 101 degrees F., and rapid pulse, 100, loss of the ordinary small appetite, and constipation. She recognized the tumor and feared vertebral tuberculosis. After a few days' observation I was called in consultation. The twenty-four hours' urine was scanty, but contained a normal amount of the normal constituents and no abnormal elements. The patient was so intractable that catheterization of the ureters was not attempted. The tumor was 12 cm. long and reached from the pelvic brim to the ribs. It was in the region of the right kidney. The fluctuation was indubitable. The heart's apex was in its normal place. There was no evidence of disease elsewhere in the body. A diagnosis of paranephritic abscess was made and on the following day, Nov. 20, 1896, the abscess was opened by the ordinary S-shaped incision. The abscess was found just behind the kidney, so that only the posterior portion of the organ could be felt. I did not think it wise to enucleate the kidney on account of the danger of opening the peritoneal cavity. The operation was done rapidly and the wound drained. Recovery was prompt. The opening was completely closed four weeks after operation, and the patient has since that time been perfectly well. I have examined the urine repeatedly and find no traces of disease.

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## ADRENAL TUMORS OF THE KIDNEY.

[ABSTRACT.]

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Grawitz first described a group of tumors of the kidney which resembled the adrenal tissue in histologic elements. He named these tumors or this condition *struma supra-renalıs aberrata*, and from that time on a war has been waged over these forms under various names, all of which are more or less significant. We may say, however, that at present, a tumor of the kidney is recognized, growing out of remnants of the embryonal adrenal gland left behind in the kidney substance itself. Similar tumors are found throughout the whole genito-urinary tract. These tumors are sometimes malignant, but more often benign. They sometimes produce constitutional symptoms, but usually they come to the notice of the physician or surgeon solely on account of their size and location.

The case which I wish to present to you very imperfectly and briefly is an illustration of that form of adrenal tumor which produces on the one hand constitutional symptoms of a most marked character, and on the other hand, shows the malignancy of metastasis.

Mr John C., 56 years old, came into the care of Dr. Edgar Hawley of Chicago in March, 1897. He had been a healthy, temperate man, and suffered no disease worthy of mention during his whole life. He had always led a moderate life, and been occupied most of the time in active office work, but during the past six or eight years has been confined for a reasonable number of hours each day to book-keeping. During the week preceding his illness he had lost in strength and appetite, but had slept well, complaining only of occasional loss of breath.

Dr. Hawley was called on the second day of the patient's absence from work. The patient was lying upon his right side; his breathing was rapid and he complained of excessive pain in the region of the right thorax. His pulse was slow, 72, and his temperature low, 99. He coughed frequently, and expectorated a bloody mucus resembling the rusty sputa of pneumonia. The patient's face was blanched, his lips red, but turgid, and an examination of the thorax revealed dulness over the whole lower half of the right lung, accompanied in places by complete absence of vocal transmission; while in other places, especially in the upper front part of the chest, there were many spots of bronchial breathing and crepitant râles. The area of cardiac dulness was greatly increased, and the area of hepatic dulness projected  $2\frac{1}{2}$  to 4 centimeters below the border of the ribs. The patient's digestive functions were carefully examined without disclosing any significant fact. Urinalysis showed that it contained no abnormal constituent, except an increased quantity of indican and an increased quantity of all the normal constituents. The patient was able to rise and sit up to drink and for stool. Symptomatic treatment was instituted. On the third day of observation the pleuritic effusion was so great and the dyspnea so severe that Dr. Hawley removed three pints of bloody serum with the aspirator. The temperature remained about 99 and the pulse varied between 70 and 80. Two days later it was necessary to remove another quart of effusion, and a week after the beginning of treatment I was called in consultation on account of the gravity of the symptoms and the failure of the consolidated lung to show any symptoms of resolution.

When I saw the patient he was suffering from terrible dyspnea. His face was full, but blanched. His lips were a bright red. His eyes were bright and expressive. He seemed to weigh about a hundred and seventy pounds. There were no symptoms of emaciation. His hands were thin and white. His whole appearance reminded me of sclerosis of the

kidney, and I instinctively uncovered his legs, expecting to find them greatly swollen with edema. I was surprised to find the legs and feet solid, but well-formed and excessively pale. The pulse at this time was hard and full, and very slow, 70 to the minute. The temperature was not quite 100, and it had never been above 100.5 at any time. My examination confirmed the examination of Dr. Hawley. There was a considerable effusion in the right pleural cavity, with a large mass of atelectatic tissue above it. The liver was depressed about 4 centimeters, but did not extend abnormally to the left. The heart's apex was  $3\frac{1}{2}$  inches from the median line, but the area of cardiac dulness extended at least 2 cm. farther to the left and 3 cm. lower than normal. The heart's apex was readily recognized on account of the fierce stroke which it made on the wall of the thorax. A careful examination of the left lung detected bronchial breathing and cog-wheel respiration in two or three places in the upper lobe; but on account of frequent coughing, these observations were not considered significant. The patient frequently expectorated a tenacious mucus which was once in a while tinged with blood. No very satisfactory examination of the abdomen could be made, because the patient could not lie down on account of the dyspnea. I assisted Dr. Hawley to remove the effusion. We succeeded in aspirating three pints of bloody serum. The character of this effusion resembled that which I had observed in cancer of the lung. A microscopic examination of this serum did not reveal any bacteria, but showed the presence of red blood corpuscles, white blood corpuscles and a few epithelial cells of uncertain origin. The examination of the sputa did not disclose the presence of the pneumococcus. After the removal of the effusion, the liver came back to its normal position under the border of the ribs.

With the absence of the evidence of pneumonia, with the absence of cachexia, with the sudden onset of the disease and its rapid course, I was only able

to make an unfavorable prognosis, leaving the diagnosis entirely to the postmortem. The subsequent course was similar to the preceding. The dyspnea continued, the pulse remained very slow and hard and full. The patient complained of no pain, and the temperature never rose above 100.5.

The postmortem was made three weeks after the beginning of the disease and twelve hours after death. It was made by Dr. Henry D. Galloway and Dr. Edgar Hawley in the presence of the house staff and nurses of the Baptist Hospital.

The body was that of a well-nourished man, apparently fifty years old. Postmortem rigidity had begun. There were no marks of swelling or edema and only a small puncture where the last aspiration had been made between the fifth and sixth ribs in the right axillary line. The right thorax was dull on percussion, the left resonant. On opening the right pleural cavity, a large quantity, probably a quart, of bloody serum without flakes or clots was removed. The right lung was a mass of solid tissue, which on section showed it was composed of light, reddish masses, contrasting sharply with the bluish-black and mottled appearance of the intervening edematous lung. These masses were hard and firm, and did not subside under pressure. They were of a uniform texture, and seemed to be the outgrowth of multiple centers. The left pleural cavity contained three or four ounces of clear serum. The left lung presented a normal, but highly pigmented appearance. The lymph glands at the root of the lung were filled apparently with years of accumulated coal dust. Three foci similar to those in the right lung, but no larger than hazel nuts, were found in the lower part of the upper lobe of the left lung. The pericardium was filled with six ounces of clear serum. The heart muscle was firm, and the ventricles contracted. The coronary arteries were markedly sclerotic. The valves of the heart were competent, but showed marked sclerosis, and in places calcification. The abdominal cavity was free from



fluid. The liver and spleen were normal, excepting for a general arterio-sclerosis. The stomach and intestines presented no marked abnormality. The right kidney was of normal size and shape and position, and was connected with the bladder by a normal ureter. The right adrenal body was of normal size and shape and location. The left kidney was surmounted on its upper end by a firm, hard tumor, the size and much the shape of a small clenched fist. Like the right kidney, it was surrounded with fat. On section the kidney itself seemed perfectly normal, except that it was encroached upon in its upper part by the tumor, but separated sharply from it by a wall of connective tissue. This kidney was connected with the bladder by a normal ureter, and there is no reason to believe it in anything but a healthy condition. The cut section of the tumor showed that it was composed of various nodules, the center of each of which was in a more or less advanced stage of apparently fatty degeneration. In a few places masses apparently of old extravasated blood were to be found. The growing portions of the tumor were nodules the size of peas, and at the periphery of the tumor. The blood supply of the tumor seemed to be rich, and on carefully dissecting up the renal vein, the tumor was found to have invaded it so as to actually hang into its caliber.

Microscopic examination of this tumor showed that it was a typical struma suprarenalis aberrata of Grawitz. Microscopic examination of the tumors found in the lungs showed that they were of the same character.

A study of the literature of this subject may be summarized in the following conclusions:

1. Remnants of the adrenal body are found in various parts of the genito-urinary tract in a large per cent. of all postmortems (90 per cent.)

2. The suprarenal capsule or adrenal body is a ductless gland essential to life. It secretes a substance which slows the pulse, contracts the capillaries, and removes the pigment from the skin. When it is

destroyed or removed, the patient dies, or if partially destroyed, he takes on the condition recognized in Addison's disease. When the adrenal body is greatly increased in its function, the skin is blanched, the heart's action is increased in power, but slowed, and the capillaries are contracted, and the whole vascular system undergoes the degeneration of arterio-sclerosis.

3. About one-third of all the tumors of the kidney appearing in adult life are of adrenal origin, but only a small proportion of these show a tendency to metastasis, and these metastatic foci are usually confined to the lungs or to the bones, and only rarely are they found in both places.

4. A few of the adrenal tumors produce the symptoms of poisoning with the adrenal extract. The poisoning does not always seem to be proportionate to the size of the tumor.

5. The removal of the tumor before metastasis takes place results in subsidence of the symptoms of poisoning. The tumors may be removed without loss of kidney substance, or by a complete nephrectomy.







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